

CATHETER FEVER.*

REPORT OF A CASE WITH A RAPIDLY FATAL TERMINATION.

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By the term "True Catheter Fever" should be implied a sudden elevation of temperature varying from 101 to 109 ° F. following instrumentation of the urethra, and in cases where obstruction to the flow is not from stricture, foreign body nor in the presence of infection, the fever is out of proportion to the amount of trauma inflicted. There are a few cases, following the introduction of a catheter through the urethra into the bladder, that will be followed by a sudden rise of temperature, carrying from 106 to 109 ° F. with corresponding increase in pulse rate and respirations which, in spite of every known precaution, will go to a rapidly fatal termination. It is of these exceptional instances that the case herein recorded furnishes a typical example, occurring as it did, entirely unassociated with stricture of any calibre as well as in the absence of infection. When one or more of these complications exist, there are obvious reasons why pyrexia may be expected to occur from either shock or pyæmia.

It is in those cases unassociated with either stricture or septic conditions of the genito-urinary tract that will be considered in the discussion of this case, because of the greater obscurity in origin and also because of the more fatal termination, these two facts leading to the belief that the obstruction is secondary to diseases of the cerebrospinal tract. Certain it is, that the theory of their infective origin cannot be satisfactorily explained by either traumatic shock, as none exists, or by dissemination of infection.

It is by no means a satisfactory explanation to say that

* Read before South Branch Philadelphia County Medical Society.

the subject of this report died from reflex shock transmitted through infection to the nerve centres solely by way of instrumentation of the urethra. To do so, would leave unaccounted for the etiology of the conditions which in this instance led to the necessity of supplanting the normal act of micturition by instrumentation. The following history seems to emphasize this conclusion.

G. P., aged 50 years, was admitted to the Methodist Episcopal Hospital, July 2, 1907, because of inability to void urine. Two weeks ago began to complain of pain on urination and at times the urethra seemed choked up. Urination was more frequent than usual, compelling him to get up at night. On Sunday, June 30, he was unable, for the first time, to void urine at all. A physician was called in but did not use catheter; gave him medicine with no beneficial results. On the following day (Monday) he passed a little water up until 4 P.M. From this time until the following day (Tuesday) there was no urine voided. He was admitted to the hospital at noon and at once taken to the operating room. This was 2 P.M.

Personal Examination.—A gaunt man of good musculature, does not look to be older than his age given, eyes somewhat sunken, left pupil somewhat larger than right, both react to light and distance. Teeth consist of a few large snags only. Lungs normal, heart sounds weak, but no murmur detectable. Abdominal inspection shows marked tumor over the bladder region. The temperature, per rectum, was 99.4° F., pulse 100, respirations 24.

The history pointed so clearly toward obstruction to the flow of urine by stricture, that the patient was at once etherized, and after a careful toilet of the parts had been made, a sterilized metal catheter was introduced, and to our surprise met with no resistance, three pints of light colored urine was withdrawn. After the catheter, which was a number 20 F., was removed, graduated sounds up to number 30 F. were passed, and were introduced without any resistance. After operation the patient's temperature, per rectum, was 103° F., respirations 30. This elevation of temperature, which came on almost immediately after the use of the sounds, quickly subsided to about 100° F. and during the afternoon the patient voided eight ounces voluntarily. This

evacuation was apparently in no way under the patient's control as he seemed to be insensible of its occurrence, and there was also no voluntary power exercised. At 12 o'clock (midnight) it was again necessary to catheterize. This catheterization did not affect the temperature. The urine collected this time was dark red, and this was shown under the microscope to be due to the presence of a small amount of blood and a trace of albumin, the latter probably due to the presence of the trace of blood.

The third catheterization was done during the morning of the following day (Wednesday) when 12 ounces were withdrawn. During the afternoon and evening of the same day, 11 ounces were voluntarily passed, the temperature varying throughout the day from 100.2° to 102.4° F. and the pulse ranged from 100 to 110, respiration 28 to 36. From midnight of the third day to 6 A.M. of the fourth he voluntarily voided 5 ounces. At 10 A.M. of the fourth day he was again catheterized, using a No. 20 F., and 10 ounces of urine were obtained. Sounds were then passed in sizes from No. 30 to No. 34 F. As force was unnecessary, their use was without pain. At 10.30 A.M., one-half hour after the passage of the sounds, the temperature was 99.6° F., pulse 112, and respiration 32. At 11.30 A.M. the nurse noticed the patient was in a chill; the temperature at this time being, per rectum, 108° F. The resident physician was immediately sent for, and on his arrival, one-half hour later, it had arisen to 109° per rectum and 108.8° in axilla, pulse 120, and respirations 34.

The patient was at once given an ice-water tub-bath, the water being kept at a temperature between 60 and 70° F. He was rubbed with ice, and ice cap kept to his head. Whiskey was given by the mouth, and strychnia $\frac{1}{30}$ gr. was given hypodermically. After remaining in the bath for fifteen minutes it was deemed advisable, on account of the pulse, to remove the patient, the temperature having dropped to 106° F. Alcohol rubbing, which was substituted for the bath, was continued fifteen minutes longer. At the end of this time the temperature was 103.2° F., making a drop of 5.2° F. in one-half hour.

The patient was now permitted to rest, and at the end of another half hour the temperature was 102.4°, pulse 144. The patient, while in the chill, was delirious for about ten minutes; he then lapsed into profound coma, remaining so for another half hour. The possibilities of apoplexy or uræmia were given con-

sideration. They, however, could be excluded because of the absence of the bounding pulse and the stertorous breathing of apoplexy, and the dilatation of the pupils with the urine odor to the breath as found in uræmia.

At 2 P.M. the temperature was 104.4° , pulse 115, respiration 26. At 7 P.M. the temperature was 102° , pulse 104, respirations 26. Again the catheter was used and was followed by a chill and a rise of temperature to 105.4° . Alcohol sponging brought it down to 102° F. At midnight the temperature was 100.4° , pulse 96, and respirations 24. Catheterization at 7 o'clock the morning of the fifth day withdrew 16 ounces of urine. From this time until midnight of the fifth day he voluntarily voided three times, amounts varying from 2 to 4 ounces at a time. From midnight of the fifth until 7.15 A.M. of the sixth day he voided 6 ounces of urine. It was again necessary to resort to catheterization at 2 P.M., when 16 ounces were obtained. Following the use of the catheter, which was a 32 F., sounds were again passed. The temperature at once went up to 104° F., pulse 112, respirations 32, and the third chill came on with delirium which again went into coma lasting about one hour. The temperature went up again to 109° F., pulse 144. A bath was given for 25 minutes, the temperature of the water being kept between 60 and 70° F. Whiskey, strychnine and digitalin were administered, the temperature dropped to 105° , and by continuing the alcohol rub, after a 25 minute bath, the temperature was further reduced to 102.8° . Again delirium and coma cleared up during the tub-bath. He remained rational for about four hours, again becoming delirious. The temperature at this time was 104.8° . The pulse dropped to 104, and respirations to 36, though at 6 o'clock, less than an hour later, the temperature had arisen to 106° . Ice-bath, stimulants and alcohol rub were given and succeeded in reducing it to 99.6° . At 9.15 A.M. (6th inst.) the temperature was 106° , and in spite of vigorous alcohol rubbing it reached 106.4° . A fourth tubbing in water between 60 and 70° F. for 20 minutes reduced it only to 104.6° . After a rest of 20 minutes in bed it had fallen to 101° , then the patient began to sink rapidly, the heart becoming feeble, and he died at 3.15 P.M. the 6th instant, less than 72 hours after admission, from cardiac failure, in spite of the use of every known agent as a preventive. Autopsy was refused, which is especially regrettable, because if a

definite lesion could be microscopically demonstrated to exist in the cerebrospinal tract, causing the retention in this class of cases, it would greatly influence the line of treatment, and probably delay a fatal termination.

This remarkable phenomenon seldom, if ever, occurs in nervous hysterical men or women whose condition is purely functional, nor in children before the age of puberty even where so much trauma is occasioned, as in the manipulations necessary in the operation of litholapaxy.

Statistics show that catheter fever in none of the recorded cases was chronic. The longest recorded case (A. Clark) lasted about three weeks, but most of the cases were of much shorter duration.

T. F. RAVEN described a case of a man 37 years of age, where, after the introduction of a catheter, the temperature, which previously had been 102°, quickly went to 105° and the pulse to 140. The temperature never subsided below 100° and the patient died, from what was regarded as an obscure affection of the nerve centre. The high temperature and increased pulse rate existing in this case before the catheter was used seems strongly to suggest the existence of systemic infection prior to the instrumentation.

In another recorded case by A. F. Weir, death followed five days after the passage of a sound, from what he regarded as pyæmia. A number of other cases are recorded where the temperature reached 106 and 107° F., eventually terminating in recovery.

W. M. BAKER considers that a striking analogy exists between ague and the shock propagated by the sympathetic nervous system through the urethra.

It is, therefore, obvious that a careful distinction must be made between true urethral fever, and infection resulting from operative interference within the urinary passage in those cases where before urethral instrumentation, no evidence of systemic infection as shown in the pulse and temperature existed.

Surgeons for the most part seem to hold to the opinion that these high temperatures and deaths that follow are due to septicæmia. This may explain the large group of cases where catheterization has been made necessary because of

urethral infection, but it cannot hold good in those cases where neither obstruction exists, nor infection is present to be disseminated. It is, therefore, important that we look further for the etiology of the pyrexia in this class of cases, and to do so, they should be considered from an etiologic standpoint under two heads:

First, and by far the largest group, are those where pyrexia follows instrumentation in the presence of urethral obstruction.

Second, are those cases where retention exists in the absence of any urethral obstruction. From a clinical standpoint, they should be further subdivided into two groups:

a. Those where the symptoms indicate pyæmia, and hence due to altered and poisoned conditions of the blood which acts secondarily on the nervous system.

b. That group where the symptoms which exist from the onset are of central nerve disease, and therefore the nervous system must be regarded as primarily affected through reflex disturbances which further react upon the vascular system, producing the outward sign of pyrexia.

In the true urethral fever cases, therefore, the most important question, which is by no means as yet satisfactorily explained, is,—“To what is the sudden high temperature that rises in a few minutes, or at the longest a few hours, after the introduction of a catheter into the bladder, due?”

It is not a sufficient explanation to content one's self with the accepted theory of reflex inhibitory nerve action, since to do so would leave unaccounted for the condition which makes retention of urine without obstruction possible. It seems quite within the scope of logical reasoning, therefore, to give much thought to the condition causing the impaired bladder-function, as it must surely share a large responsibility in disturbing the heat centres and giving rise to the resulting symptom complex.

It is a clinical fact that the particular point within the urethral canal that causes the systemic shock when the catheter is passed is at the vesical neck.

It is also a physiologic fact that the vesical constrictor muscle in this region of the bladder is controlled by a reflex nerve centre situated partly within the sympathetic and partly within the lumbar portion of the cord, both of which sets of nerves are united in the hypogastric plexus, and in the case that furnishes this report, there was evidently some stimulation of the centre controlling the vesical neck which acted so powerfully as to prevent the occurrence of dribbling or incontinence of retention, as the bladder was distended to its utmost capacity for two days. Another striking symptom in this case was that, notwithstanding the power of the constriction at the neck still existed, there was both loss of sensibility of the bladder walls, as well as of voluntary power. This fact is plainly shown in the history, as the patient at no time complained of discomfort from the immensely distended bladder, which would, had sensation been acute, caused suffering from one-third the amount retained.

This loss of both sensation and voluntary power justifies the belief that there was also defect in the dorsal region of the cord, as the longitudinal fibres of the posterior columns have been shown to be centres that have to do with reflex muscular co-ordination, hence the impairment in the function of the bladder walls can be, with reasonable clearness, shown to have, in this case at least, been due to central lesion. Thus it is possible to trace the nervous tract from the deep urethra and bladder to the nerve centres in the sympathetic, lumbar and dorsal portions of the spinal cord, the path by which its reflex inhibitory nerve influences pass.

One of the most plausible explanations of the remarkable phenomenon demonstrable in this case is that the nervous system in its entirety may be regarded as the most potent factor in maintaining the body in a normal condition of health, and that a disturbance in any part of it, directly connected with the nerve centres, will disturb the centre for the regulation of temperature. It seems, therefore, probable that the chief factor in true urethral fever is a disturbance of the thermogenic centres through the vesical centres. That fact

is further illustrated in the extensive reflex nerve disturbance, especially shown in the bladder, and in cases operated for hemorrhoids, and also in many cases which directly affect the central nervous organism, as illustrated in injuries of the spine, and also in general systemic infections as found in the exanthemata, rheumatism of the joints, etc., which proves, therefore, beyond doubt that within the deep urethra is located a prominent part of the nervous system that controls the balance of power for the regulation of heat distribution and elimination.

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